

STDs in Women and Infants

Public Health Impact

Women and infants disproportionately bear the long term consequences of STDs. Women infected with *Neisseria gonorrhoeae* or *Chlamydia trachomatis* can develop pelvic inflammatory disease (PID), which, in turn, may lead to adverse reproductive consequences such as ectopic pregnancy and tubal factor infertility. If not adequately treated, 20% to 40% of women infected with chlamydia¹ and 10% to 40% of women infected with gonorrhea² develop PID. Among women with PID, scarring sequelae will cause involuntary infertility in 20%, ectopic pregnancy in 9%, and chronic pelvic pain in 18%.³ Approximately 70% of chlamydial infections and 50% of gonococcal infections in women are asymptomatic.⁴⁻⁶ These infections are detected primarily through screening programs. The vague symptoms associated with chlamydial and gonococcal PID cause 85% of women to delay seeking medical care, thereby increasing the risk of infertility and ectopic pregnancy.⁷ Data from a randomized controlled trial of chlamydia screening in a managed care setting suggest that such screening programs can reduce the incidence of PID by as much as 60%.⁸

Gonorrhea and chlamydia can also result in adverse outcomes of pregnancy, including neonatal ophthalmia and, in the case of chlamydia, neonatal pneumonia. Although topical prophylaxis at delivery is effective for prevention of ophthalmia neonatorum, prevention of neonatal pneumonia requires antenatal detection and treatment.

Genital infections with human papillomavirus (HPV) in women are a major concern because specific types (e.g., types 16, 18, 31, 33, and 35), are causally related to cervical cancer; these types also cause Pap smear abnormalities. Other types (e.g., types 6 and 11) cause genital warts and, in child-bearing women, can cause recurrent respiratory papillomatosis in infants.⁹

When a woman has a syphilis infection during pregnancy, she may transmit the infection to the fetus in utero. This may result in fetal death or an infant born with physical and mental developmental disabilities. Most cases of congenital syphilis are preventable if women are screened for syphilis and treated early during prenatal care.¹⁰

Observations

- Between 1998 and 1999, the reported case rate of chlamydial infections in women increased from 377.6 to 404.5 per 100,000 females (Figure 6, Table 6). This increase most likely reflects a variety of different factors, including increased screening activities, the use of more sensitive diagnostic tests and changes to information systems to incorporate laboratory reporting rather than an increase in the number of new cases of chlamydia occurring among women; even as reported cases of chlamydia have increased each year, the prevalence among women screened in the United States has generally declined (see section on Chlamydia). Despite considerable under-reporting, it is important to note that

female chlamydia rates exceed gonorrhea rates among women in many states (Figures A and B, Tables 6 and 15).

- In 1999, the median state-specific chlamydia test positivity among 15- to 24-year-old women screened in selected prenatal clinics in 22 states was 7.2% (range, 4.5% to 14.4%) (Figure E).
- Gonorrhea rates among women exceeded the HP2000 objective of 100 cases per 100,000 persons in 24 states in 1999 (Figure B, Table 15), the same number as in 1998. Forty-two states had gonorrhea rates among women in 1999 that exceeded the provisional HP2010 objective of 19 cases per 100,000 persons.¹¹ As in previous years, the highest rates of gonorrhea among women in 1999 occurred in the South (Figure B).
- Like chlamydia, gonorrhea is often asymptomatic in women and can only be identified through screening. Large-scale screening programs for gonorrhea in women began in the late 1970s. After an initial increase in cases detected through screening, gonorrhea rates for both women and men declined steadily throughout the 1980s and early 1990s (Figure 14, Tables 15 and 16). However, the gonorrhea rate for women in 1999 (129.9 per 100,000 females) was similar to the 1998 rate of 130.0 cases per 100,000 females. The gonorrhea rate among men increased between 1998 and 1999, from 132.7 to 136.0 cases per 100,000 males. Men with gonorrhea are usually symptomatic and may seek care; therefore, trends in men may be a relatively good indicator of trends in incidence of disease. As with chlamydia, trends in reported gonorrhea rates among women are likely to be more reflective of screening practices rather than the actual burden of disease.
- In 1999, the median state-specific gonorrhea test positivity among 15- to 24-year-old women screened in selected prenatal clinics in 15 states was 1.1% (range, 0.0% to 4.1%) (Figure F).
- The HP2000 objective for primary and secondary (P&S) syphilis is 4.0 cases per 100,000 persons. Primary and secondary syphilis rates for women exceeded the HP2000 objective in 9 southern states (Alabama, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, and Tennessee) and in the state of Indiana (Table 26). The HP2010 objective for P&S syphilis is 0.2 cases per 100,000 persons. Thirty-eight states and two outlying areas had 1999 P&S syphilis rates among women that exceeded the HP2010 objective. For congenital syphilis, the HP2000 objective is 40 cases per 100,000 live births. Only one state had a 1999 rate that exceeded this objective (Figure D, Table 38). The HP2010 objective for congenital syphilis is 1 case per 100,000 live births. Twenty-eight states and one outlying area had reported rates higher than this objective in 1999.
- The rate of congenital syphilis closely follows the trend of P&S syphilis in women (Figure 33). Peaks in congenital syphilis usually occur one year after peaks in P&S syphilis in women. The congenital syphilis rate peaked in 1991 at 107.3 cases per 100,000 live births and has declined by 87% to 14.3 cases per 100,000 live births in 1999 (Figure 34, Table 37). The rate of P&S syphilis in women peaked at 17.3 cases per 100,000 females in 1990 and declined 88% to 2.0 cases per 100,000 females in 1999 (Figure 33, Table 26).

- Although the 1999 reported rate of congenital syphilis for the United States, 14.3 cases per 100,000 live births, is below the HP2000 objective of 40 cases per 100,000 live births, this objective is many times greater than the rate of congenital syphilis of most industrialized countries where syphilis and congenital syphilis have nearly been eliminated.¹² The 1999 reported rate is well above the HP2010 provisional objective of 1 case per 100,000 live births.
- Accurate estimates of pelvic inflammatory disease (PID) and tubal factor infertility from gonococcal and chlamydial infections are difficult to obtain. Definitive diagnosis of these conditions can be complex, requiring for example, laparoscopy or laparotomy, while tubal patency studies may be needed to accurately document these conditions. Most cases of PID are treated on the basis of interpretations of clinical findings, which vary between individual practitioners. In addition, the settings in which care is provided can vary considerably over time. For example, women with PID who would have been hospitalized in the 1980s may be treated in outpatient facilities during the 1990s. Trends in hospitalized PID have declined steadily throughout the 1980s and early 1990s but have remained relatively constant from 1995 through 1998 (Figure H). These trends may be more reflective of changes in the etiologic spectrum (with increasing proportions of more indolent chlamydial infection) and clinical management of PID (from inpatient to outpatient) rather than true trends in disease.¹³
- The reported number of initial visits to physicians' offices for PID through the National Disease and Therapeutic Index (NDTI) has generally declined from 1993 through 1999. However, the reported number of visits in 1999 was slightly greater than the number of initial visits reported in 1998 (Figure I). In 1998, an estimated 238,000 cases of PID were diagnosed in emergency departments among women 15 to 44 years of age (National Hospital Ambulatory Medical Care Survey, NCHS). This estimated number has a relative standard error of 18%.
- Recent evidence suggests that health care practices associated with ectopic pregnancy also changed in the late 1980s and early 1990s. Before that time, treatment of ectopic pregnancy usually required admission to a hospital. Hospitalization statistics were therefore useful for monitoring trends in ectopic pregnancy. Beginning in 1989, hospitalizations for ectopic pregnancy began to decline. However, the number of reported hospitalizations for ectopic pregnancy increased in 1998 relative to the number reported in 1997 with the 1998 level similar to that reported in 1995 (Figure G). Data from outpatient care surveys suggest that nearly half of all ectopic pregnancies are treated on an outpatient basis.¹⁴

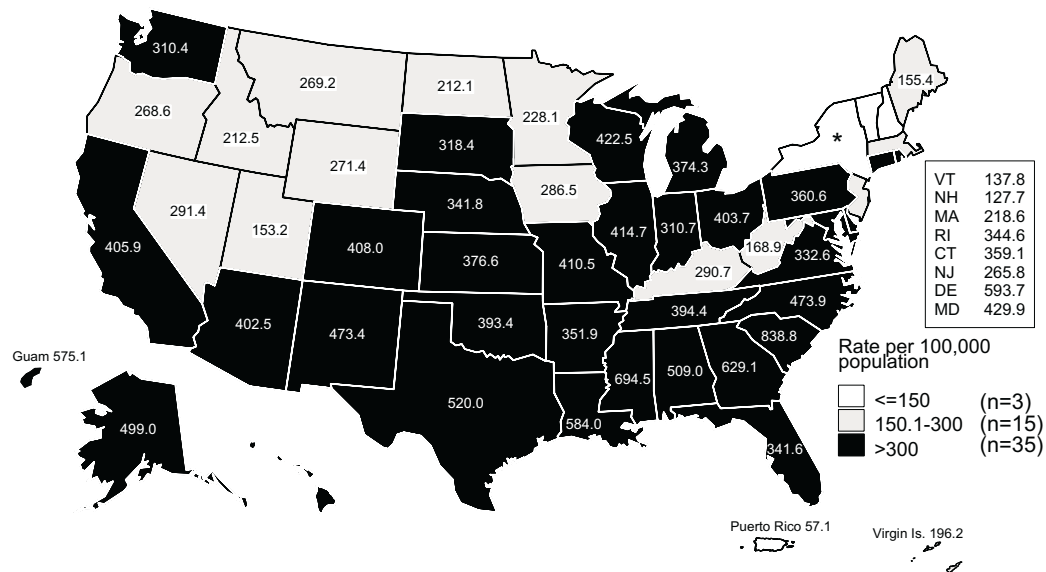
¹Stamm WE, Guinan ME, Johnson C. Effect of treatment regimens for *Neisseria gonorrhoeae* on simultaneous infections with *Chlamydia trachomatis*. *N Engl J Med* 1984;310:545-9.

²Platt R, Rice PA, McCormack WM. Risk of acquiring gonorrhea and prevalence of abnormal adnexal findings among women recently exposed to gonorrhea. *JAMA* 1983;250:3205-9.

³Westrom L, Joesoef R, Reynolds G, et al. Pelvic inflammatory disease and fertility: a cohort study of 1,844 women with laparoscopically verified disease and 657 control women with normal laparoscopy. *Sex Transm Dis* 1992;9:185-92.

- ⁴Hook EW III, Handsfield HH. Gonococcal infections in the adult. In: Holmes KK, Mardh PA, Sparling PF, et al, eds. *Sexually Transmitted Diseases*, 2nd edition. New York City: McGraw-Hill, Inc, 1990:149-65.
- ⁵Stamm WE, Holmes KK. *Chlamydia trachomatis* infections in the adult. In: Holmes KK, Mardh PA, Sparling PF, et al, eds. *Sexually Transmitted Diseases*, 2nd edition. New York City: McGraw-Hill, Inc, 1990:181-93.
- ⁶Zimmerman HL, Potterat JJ, Dukes RL, et al. Epidemiologic differences between chlamydia and gonorrhea. *Am J Public Health* 1990;80:1338-42.
- ⁷Hillis SD, Joesoef R, Marchbanks PA, et al. Delayed care of pelvic inflammatory disease as a risk factor for impaired fertility. *Am J Obstet Gynecol* 1993;168:1503-9.
- ⁸Scholes D, Stergachis A, Heidrich FE, Andrilla H, Holmes KK, Stamm WE. Prevention of pelvic inflammatory disease by screening for cervical chlamydial infection. *N Engl J Med* 1996;34(21):1362-6.
- ⁹Division of STD Prevention. *Prevention of Genital HPV Infection and Sequelae: Report of an External Consultants' Meeting*. National Center for HIV, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, December 1999.
- ¹⁰Centers for Disease Control. Guidelines for prevention and control of congenital syphilis. *MMWR* 1988;37(No.S-1).
- ¹¹U.S. Department of Health and Human Services. *Healthy People 2010 (Conference Edition, in Two Volumes)*. U.S. Government Printing Office, Washington, D.C., 2000.
- ¹²Division of STD/HIV Prevention. *Healthy People 2000: National Health Promotion and Disease Objectives. Progress Review: Sexually Transmitted Diseases*, October 26, 1994.
- ¹³Rolfs RT, Galaid EI, Zaidi AA. Pelvic inflammatory disease: trends in hospitalization and office visits, 1979 through 1988. *Am J Obstet Gynecol* 1992;166:983-90.
- ¹⁴Centers for Disease Control and Prevention. Ectopic pregnancy in the United States, 1990-1992. *MMWR* 1995;44:46-8.

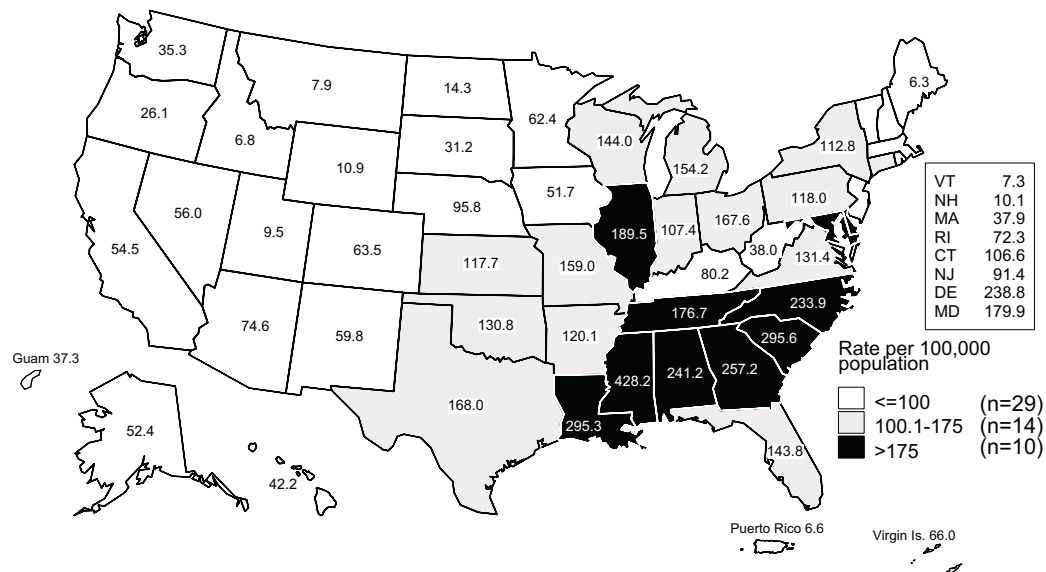
Figure A. Chlamydia — Rates for women by state: United States and outlying areas, 1999



*The New York City rate was 607.8 per 100,000 population. No cases were reported outside of New York City.

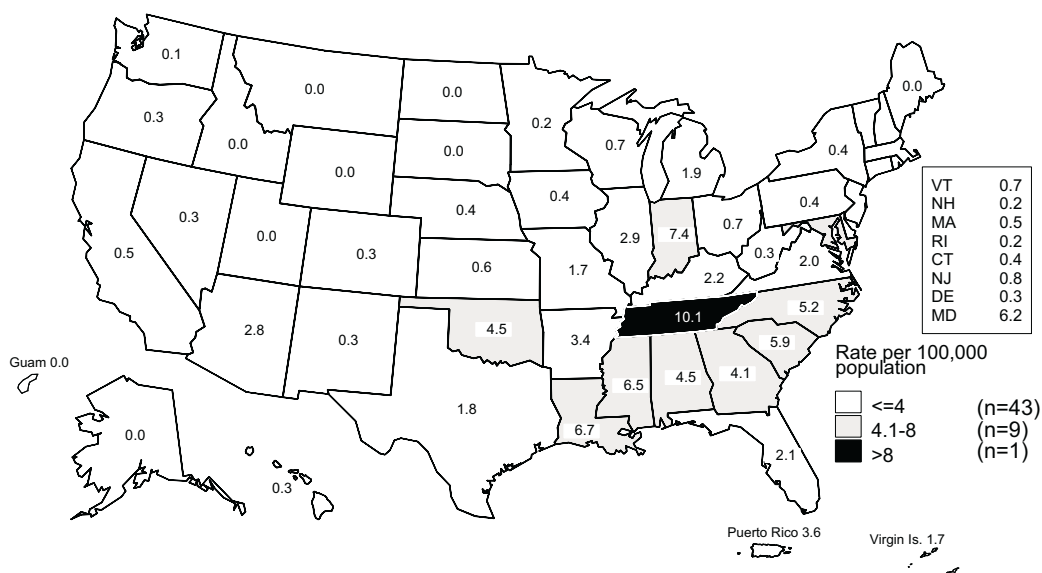
Note: The total rate of chlamydia for women in the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 399.4 per 100,000 population. For further information on chlamydia reporting see the Appendix.

Figure B. Gonorrhea — Rates for women by state: United States and outlying areas, 1999



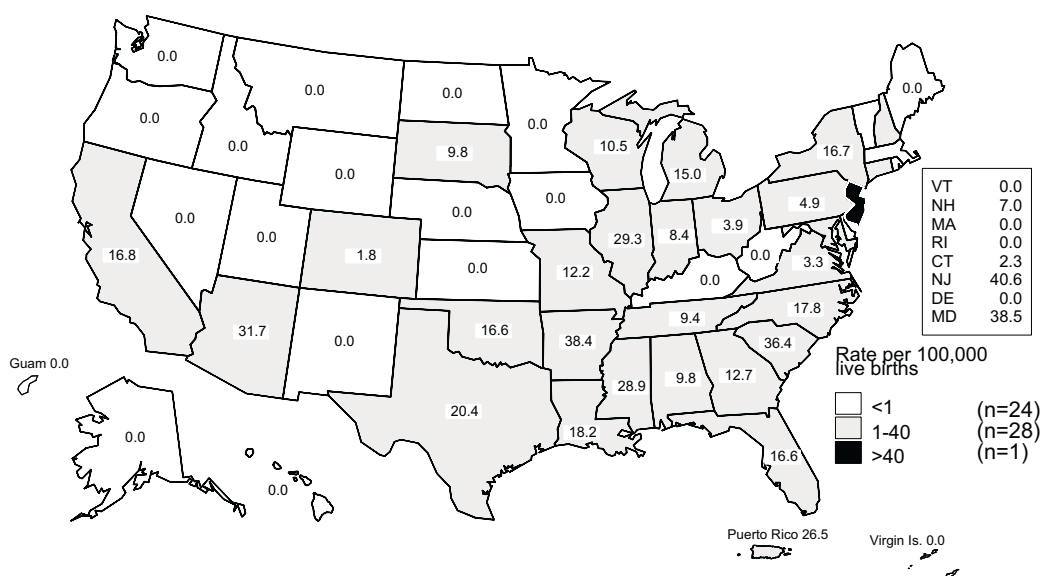
Note: The total rate of gonorrhea for women in the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 128.0 per 100,000 population. The Healthy People year 2000 objective is 175 per 100,000 population for women aged 15-44.

Figure C. Primary and secondary syphilis — Rates for women by state: United States and outlying areas, 1999



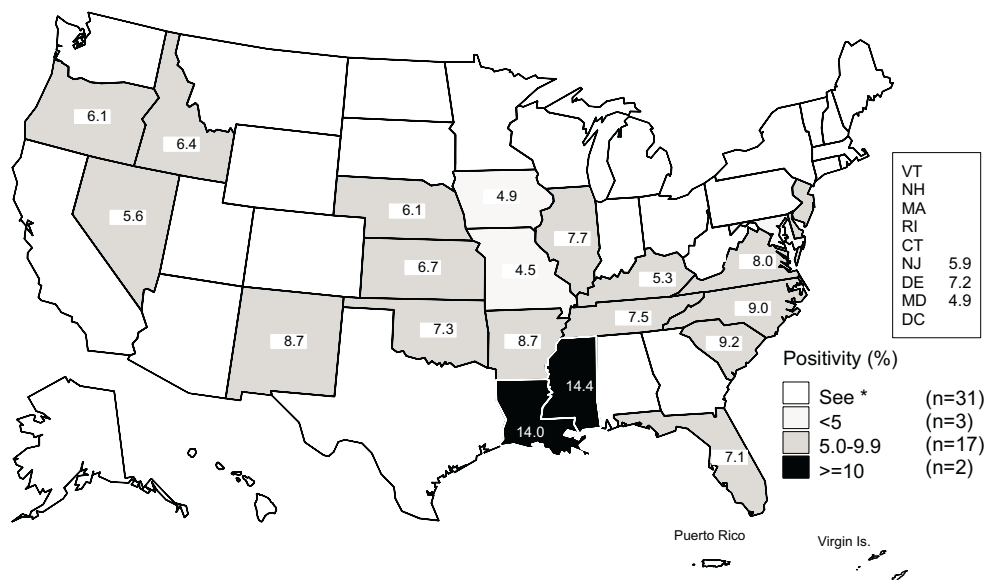
Note: The total rate of primary and secondary syphilis for women in the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 2.0 per 100,000 population. The Healthy People year 2000 objective is 4.0 per 100,000 population.

Figure D. Congenital syphilis — Rates for infants <1 year of age by state: United States and outlying areas, 1999



Note: The total rate of congenital syphilis for infants <1 year of age for the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 14.5 per 100,000 live births. The Healthy People year 2000 objective is 40.0 per 100,000 live births.

Figure E. Chlamydia — Positivity among 15-24 year old women tested in prenatal clinics by state, 1999

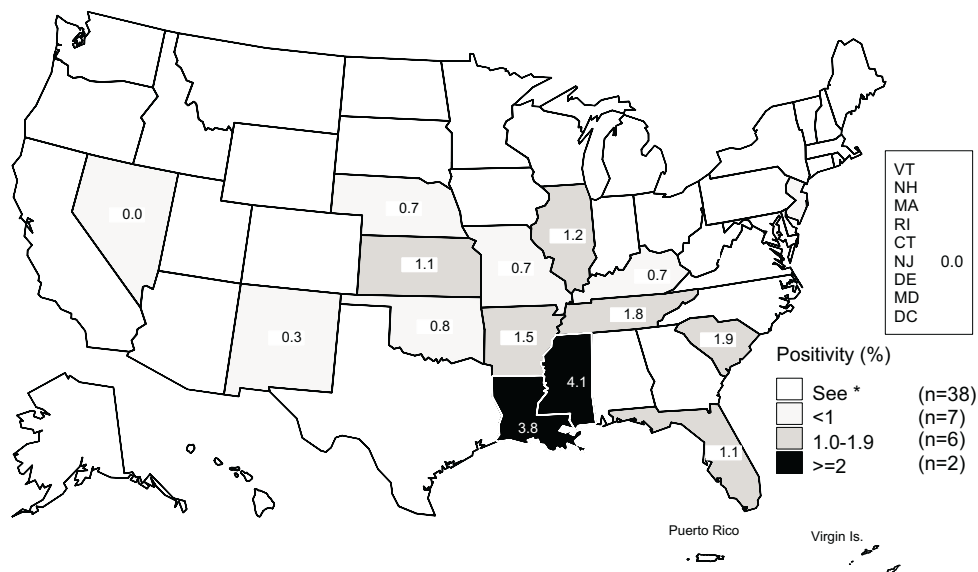


*States not reporting chlamydia positivity data in prenatal clinics.

Note: States reported chlamydia positivity data on at least 100 women aged 15-24 years during 1999.

SOURCE: Regional Infertility Prevention Programs; Office of Population Affairs; Local and State STD Control Programs; Centers for Disease Control and Prevention

Figure F. Gonorrhea — Positivity among 15-24 year old women tested in prenatal clinics by state, 1999

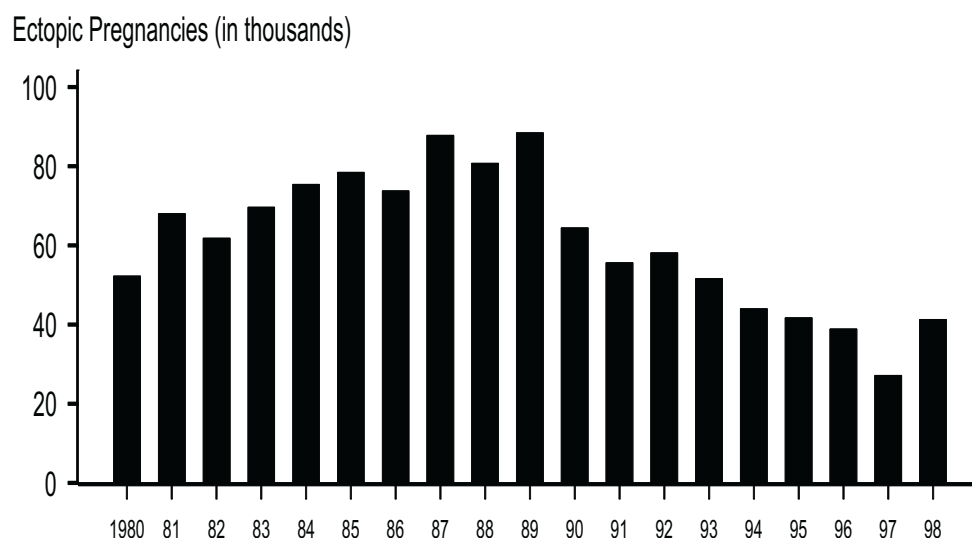


*States not reporting gonorrhea positivity data in prenatal clinics.

Note: States reported gonorrhea positivity data on at least 100 women aged 15-24 years during 1999.
New Jersey reported gonorrhea positivity data for July-December only.

SOURCE: Regional Infertility Prevention Programs; Office of Population Affairs; Local and State STD Control Programs; Centers for Disease Control and Prevention

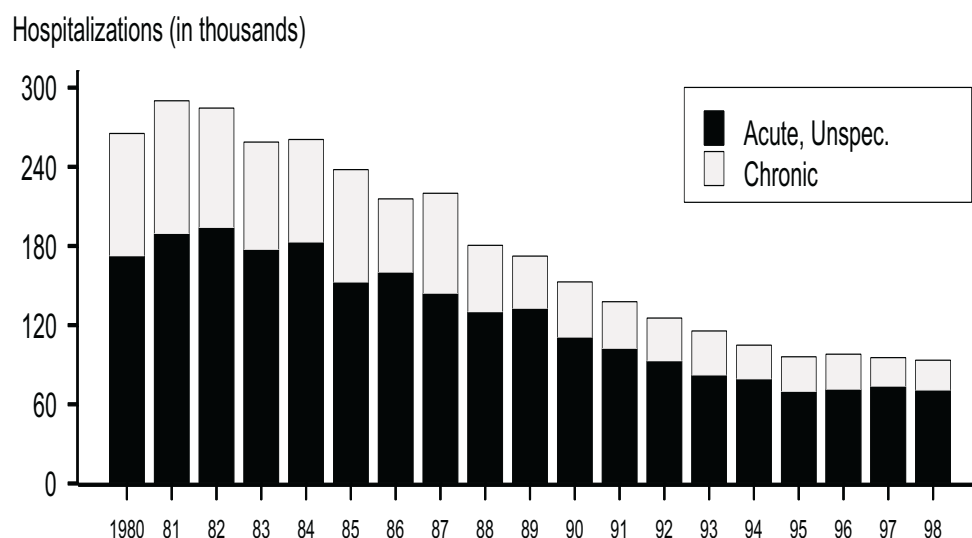
Figure G. Ectopic pregnancy — Hospitalizations of women 15-44 years of age: United States, 1980-1998



Note: Some variations in 1981 and 1988 numbers may be due to changes in sampling procedures. The relative standard error for these estimates ranges from 8% to 11%.

SOURCE: National Hospital Discharge Survey (National Center for Health Statistics, CDC)

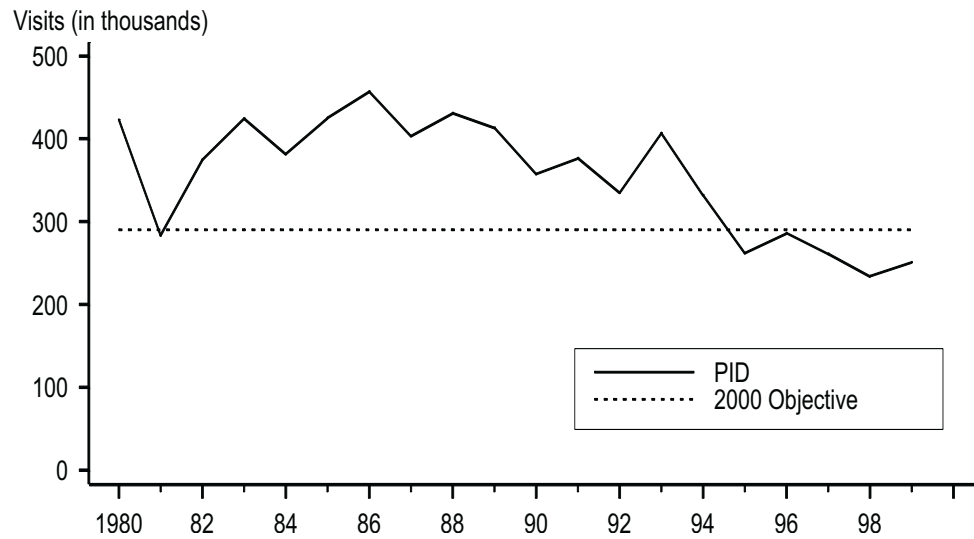
Figure H. Pelvic inflammatory disease — Hospitalizations of women 15-44 years of age: United States, 1980-1998



Note: The relative standard error for the estimates of the overall total number of PID cases range from 6% to 9%.

SOURCE: National Hospital Discharge Survey (National Center for Health Statistics, CDC)

Figure 1. Pelvic inflammatory disease — Initial visits to physicians' offices by women 15-44 years of age: United States, 1980-1999 and Healthy People year 2000 objective



Note: See Appendix.

SOURCE: National Disease and Therapeutic Index (IMS America, Ltd.)

